Coronary Heart Disease

Definition: Decreased flow of blood through the coronary arteries, usually caused by atherosclerosis. This results in a decreased oxygen supply to the heart muscle, and can cause reduced function of the heart muscle and destruction of heart muscle cells (myocardial infarction or "heart attack.") ICD-9 codes 410-414, 429.2 .

Summary

Coronary heart disease accounted for 8,596 deaths in Washington in 1994 (age-adjusted death rate: 86.6 per 100,000). Coronary heart disease is the leading cause of death and lost life expectancy in Washington and in the United States.

Many of these deaths can be prevented or delayed by reducing known risk factors, such as physical inactivity, tobacco use, high blood pressure, high blood cholesterol, and poor nutrition. Interventions focus on these risk factors utilizing strategies of public and professional education, environmental and policy change, and improving access to services.

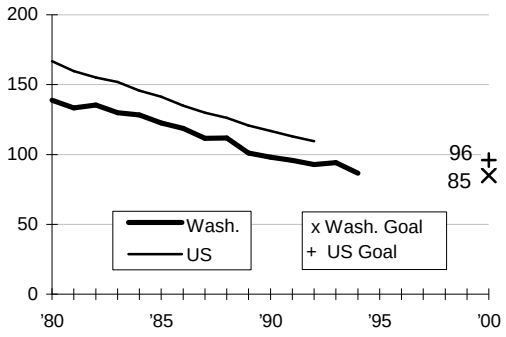
Time Trends

Coronary heart disease (CHD) age-adjusted death rates have declined steadily in Washington since 1980. This decline parallels a downward trend in the entire US during this period.

Some of the mortality reductions are explained by declines in the prevalence of risk factors such as cigarette smoking and uncontrolled high blood pressure. Major therapeutic advances in prevention of blood clots and improvement of blood flow in clogged arteries have also contributed to mortality reductions.

Coronary Heart Disease

Age-Adjusted Death Rates Per 100,000 Persons, with Year 2000 Goals



Year 2000 Goal

Washington's goal for the year 2000 is an age-adjusted coronary heart disease death rate of 85/100,000 or lower. The state average age-adjusted coronary heart disease death rate in 1994 was 86.6. The goal for coronary heart disease mortality reduction is very likely to be reached. However, due to the increasing population of older adults in the state, reductions in coronary heart disease incidence and related costs will require increased emphasis on prevention through reducing the major modifiable heart disease risk factors.

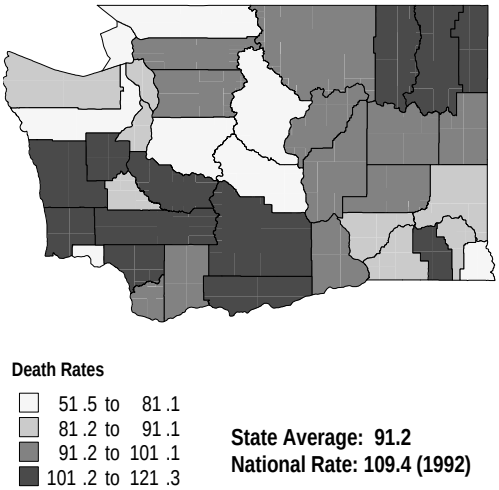
Geographic Variation

The counties with the highest average annual rates for 1992 through 1994 were Lewis, Grays Harbor, Stevens, Yakima, Ferry, Cowlitz, Mason, Columbia, Pend Oreille, Pierce, Klickitat, and Pacific.

The counties with the lowest rates were San Juan, Wahkiakum, Whatcom, Jefferson, Kittitas, King, Asotin, and Chelan.

Coronary Heart Disease

Average Age-Adjusted Death Rates, 1992-1994



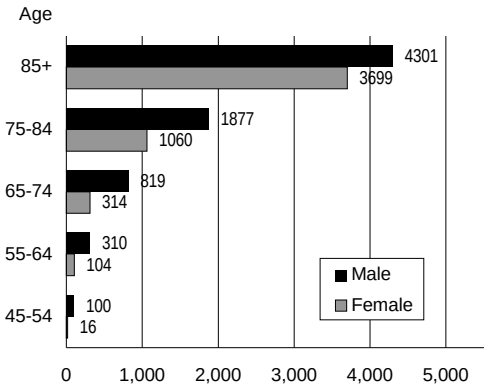
State Average: 91.2
National Rate: 109.4 (1992)

Age and Gender

Coronary heart is primarily a disease of older adults. The age-specific death rates increase dramatically for those over age 65.

Men tend to develop symptomatic heart disease about seven to ten years earlier than women. For all age groups, death rates are substantially higher for men, who accounted for about 55% of all coronary heart disease deaths in the state in 1994. Women have not been addressed in prevention efforts to the same degree as men, however.

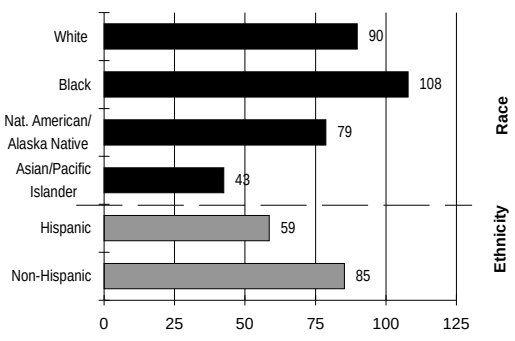
Coronary Heart Disease
by Age and Gender
Age-Specific Deaths per 100,000, Wash. State, 1994



Race and Ethnicity

In 1994, African Americans had significantly higher age-adjusted coronary heart disease death rates than other racial groups. The rate for persons of Hispanic descent was much lower than that for non-Hispanics. The reasons for the low Hispanic rates are unclear; however, national data show a similar pattern.

Coronary Heart Disease
by Race and Ethnicity
Age-Adjusted Deaths per 100,000
Wash. State, 1994



Income and Education

Low income, lack of education and other indicators of low socioeconomic status have been shown to be associated with higher heart disease mortality. Heart disease death rates are higher in Washington counties where larger percentages of adults have not graduated from high school. Studies in King County have shown higher rates of heart disease mortality in high poverty areas.[1]

Other Measures of Impact and Burden

Incidence. While heart disease mortality has been declining, there is evidence that the incidence of the disease--the number of people newly affected each year--has been increasing.[2] One in five Americans will develop symptoms of coronary heart disease before age 60. The absolute number of persons in the US experiencing heart disease for the first time is expected to increase about 38% between 1980 and 2010, largely due to the growing number of older Americans.

Hospitalization. Between 1990 and 1994 in Washington, the *number* of admissions for heart attack rose slightly each year while the *rate* of admissions per 1,000 decreased slightly. In 1994, coronary heart disease accounted for 26,413 hospitalizations among Washington residents, a rate of 5 per 1000 people. This accounted for about 108,400 hospital days and charges totaling about $350 million. These numbers exclude substantial costs due to expensive treatments, such as coronary artery bypass graft (CABG) surgery and percutaneous coronary artery balloon angioplasty (PTCA) therapy.

Quality of Life. Nationally, nearly 6 million people were estimated to be living with heart disease in the latter half of the 1980s, and Americans experience about 1.5 million heart attacks each year. These numbers are steadily increasing.

Sophisticated treatments such as CABG surgery and PTCA do *not* treat the underlying disease. Progression of disease and subsequent heart attacks often result in additional damage to the heart or the brain and increasing disability.

Co-outcomes. Atherosclerosis, the deposition of cholesterol-laden material along arterial walls, is the pathological process underlying coronary heart disease. It occurs throughout the arterial blood system, resulting in significant decreases in blood flow in many areas. In addition to the heart, this

process commonly affects the feet and legs, kidneys and brain. It may result in loss of limbs, kidney failure, or stroke. Such complications are particularly common in persons with diabetes mellitus.

Risk and Protective Factors

Atherosclerosis, the process underlying most coronary heart disease, usually develops when one or more non-modifiable or modifiable risk factors are present. The presence of multiple risk factors greatly increases risk. Each of the following four primary modifiable risk factors roughly doubles the risk of developing coronary heart disease:

Tobacco use. Cigarette smoking is considered the most important preventable cause of premature death and disease in the United States. It is responsible for more than one of every six deaths and is associated with almost 20% of heart disease and stroke deaths in Washington. Cigarette smokers are twice as likely to develop heart disease, and are more likely to experience sudden death than non-smokers.

Sedentary Lifestyle. Regular physical activity reduces the risk of heart disease by improving blood cholesterol and blood pressure levels, controlling body weight, and helping to prevent and manage diabetes.

High blood pressure. When blood pressure is high, the heart has to work harder and the increased pressure can damage blood vessels to vital organs such as the heart, brain and kidneys.

Poor nutrition and high blood cholesterol. High blood cholesterol contributes to the development of atherosclerosis and heart attacks by increasing the speed of arterial plaque formation and reducing the stability of plaques. A diet high in saturated fat and total fat generally raises blood cholesterol and contributes to this process, which leads to plaque rupture and arterial blockage that causes heart attacks. Reducing the cholesterol levels, through diet, exercise and other means stabilizes plaques and may prevent progression of disease and further clinical events.

High Risk Groups

Any group of people in whom the major risk factors are concentrated will tend to have higher rates of coronary heart disease than the population as a whole. In general, there are five such groups, both nationally and in Washington State:

The elderly. The prevalence of high blood pressure among Americans increases dramatically with age, as does the risk of heart disease. An estimated 25% of all Americans have high blood pressure, while the estimate for those age 70 and older is over 60%.

The poor. Low income, lack of education, and other indicators of low socioeconomic status have been shown to be associated with higher heart disease mortality. This may be related to poor access to medical care services, as well as to high rates of modifiable risk factors.[3]

African Americans. African Americans develop high blood pressure at an earlier age and tend to have more severe hypertension than whites. Their rates of high blood pressure are among the highest in the world. While genetics probably plays a role, stress, diet and other factors are also implicated.[4]

People with diabetes. More than 60% of people with diabetes die of heart disease, stroke, or some other form of blood vessel disease. Persons with diabetes develop coronary artery disease at younger ages, have more diffuse disease and atherosclerosis progresses more rapidly than in the general population. Careful management of blood sugar levels and modification of risk factors can help prevent these complications.

Persons with known coronary heart disease. These people are at increased risk for recurrent events. Aggressive action to modify their risk factors can prevent future heart attacks and may slow the progression of disease.[5] Medications are more likely to be used in addition to other measures in this group to control elevated blood pressure or blood cholesterol levels.

Intervention Points, Strategies and Effectiveness

Control of risk factors throughout the lifecyle, in individuals with and without known coronary heart disease, will yield the largest reductions in morbidity and mortality due to this disease. Two complementary public health approaches to preventing coronary heart disease are available:

1)Reduce the prevalence of risk factors in the entire population. For example, the National Heart, Lung and Blood Institute estimates that reducing blood pressure in the entire US population by 2 mmHg might reduce the annual mortality from coronary heart disease by 4 percent. [6]

2)Make special attempts to reduce modifiable risk factors among populations with especially high rates of coronary heart disease.

Some population-based strategies use interventions that focus on individual and community-level communication techniques to encourage healthy lifestyle choices. Others rely on developing and implementing public policies to support risk factor reduction. Still others concentrate on educating physicians and other health professionals and encouraging them to place greater emphasis on delivering preventive care. Interventions may be aimed at the general public, specific high risk target populations, policy makers, or health care professionals. Successful interventions for each of the major risk factors for heart disease are described elsewhere in this document.

The most successful interventions for the prevention of coronary heart disease are those which are part of integrated programs that use more than one approach and address multiple risk factors. The National Heart, Lung and Blood Institute funded three large projects to study the impact of different approaches and risk factor interventions. The Stanford 5 Cities study showed most clearly that community-wide education can decrease cardiovascular disease risk factors in a population.[7] Notable successes in population-based approaches to coronary heart disease risk factor reduction, particularly in tobacco control and in short-term strategies to increase physical activity levels and control weight in target populations, have been documented. [8] Further work is needed, however, to develop effective strategies applicable across a wide range of communities. Nationally, blood pressure and cholesterol levels have decreased, as have smoking rates, over the past ten years. Future efforts will focus on further decreases in these risk factors, on improving physical activity levels (which have not improved) and on reaching high risk populations who have not yet been successfully impacted by risk factor reduction efforts.

See related sections on Diabetes, High Blood Pressure, High Blood Cholesterol, , Physical Inactivity, Nutrition and Tobacco Use and Exposure.

Data Sources

State death data: Washington Department of Health, Center for Health Statistics

National death data: National Center for Health Statistics

State survey data: Behavioral Risk Factor Surveillance system (BRFSS)

State hospitalization data: Comprehensive Hospital Abstract Reporting System (CHARS)

For More Information

Washington State Heart Disease and Stroke Prevention Plan, Washington Department of Health, February 1995

Washington Department of Health, Heart Health Program (360) 586-6091.

Centers for Disease Control and Prevention. "Cardiovascular Disease Surveillance: Ischemic Heart Disease: 1980-1989." US Department of Health and Human Services, CDC, Atlanta, GA. 1993.

Technical Notes

Age adjustment: See technical appendix.

Race and ethnicity: See technical appendix.

Endnotes:

[1] Seattle-King County Department of Public Health. *The Health of King County*, 1991. SKCDPH, Seattle, WA. 1992.

[2] Weinstein M, Coxson PG, Williams LW, Pass TM, et al. Forecasting coronary heart disease incidence, mortality, and cost: The Coronary Heart Disease Policy Model. Am J Public Health. 77(11):1417-26. 1987.

[3] Wing S, Casper M,Riggin W, et al. Socioenvironmental characteristics associated with the onset of decline in ischemic heart disease mortality in the United States. Am J Public Health. 78:923-6. 1988.

[4] Brownson R, Remington P, and J. Davis (Editors). Chronic Disease Epidemiology and Control. Washington, DC: American Public Health Association, 1993

[5] Pearson T, M. Criqui, R. Luepker, A. Oberman, and M. Winston (Editors). Primer in Preventive Cardiology. Dallas, TX: American Heart Association, 1994

[6] US National Heart, Lung and Blood Institute, National High Blood Pressure Education Program. The Fifth Report of the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure (JNC V). Washington, DC: US Department of Health and Human Services NIH 93-1088. Arch. Internal Medicine 1993; 153-183

[7] Farquhar, J.W., S. Fortmann, J. Flora, B. Taylor, W. Haskell, P. Williams, N. Maccoby and P. Wood. Effects of Communitywide Education on Cardiovascular Disease Risk Factors: The Stanford Five-City Project, JAMA. July 18, 1990;264,3:359-365.

[8] Bracht, N. (Editor) Health Promotion at the Community Level. Sage Publications, Newbury Park, CA, 1990